



RTT to 9-1-1 Considerations

Federal Communications
Commission

October 6, 2016

Making Connections that Matter®



Agenda

- Replacement for TTY
- RTT Characterization
- Real Time Communication Compared with SMS
- Text to 9-1-1 Deployment Data
- Text to 9-1-1 Impairment Data Since Inception
- Sample 9-1-1 Network with RTT
- Implementation Details
- Summary: RTT-to-TTY
- Summary: RTT to ESInet
- Summary: Transitional Scenarios

Replacement for TTY

- Drivers
 - Limitations of TTY related to speed, characters supported, ease of use in IP networks
- Standards for a Replacement
 - IETF uses SIP (RFC 3261) and RTP (RFC 3550 and 3551) to stream text as T.140 (RFC 4103). This Real Time Text (RTT) solution is the one referenced by NENA
 - No emergency RTT standards for carriers, though ATIS has started one
- Evolution
 - This RTT variety will be adopted by other access technologies
 - NG9-1-1 PSAPs will support RTT
 - RTT clients will proliferate but will likely never be more popular than text messaging
- Challenges
 - Existing legacy PSAPs don't support RTT
 - Additional work required to add an audio stream to the text stream in order to capture background noise

Real Time Text (RTT) Characterization

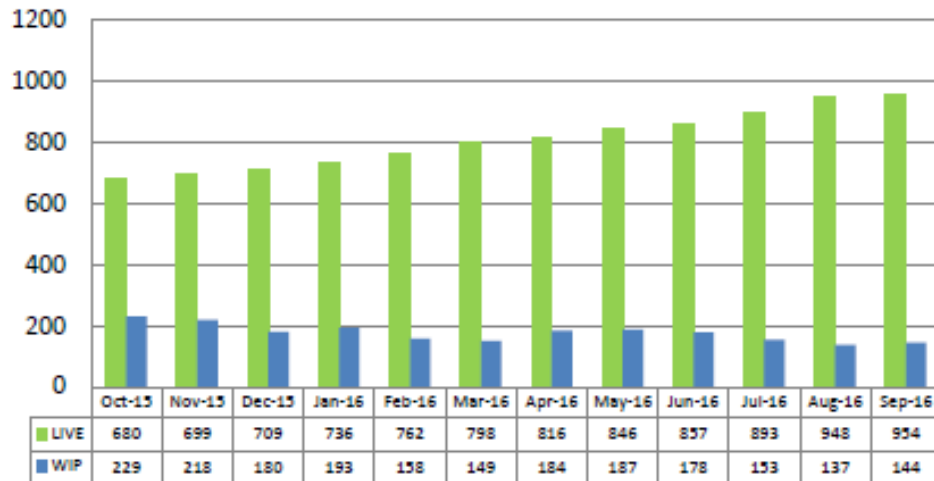
- What is Real Time Text generally?
 - It is Real Time Communication of text, similar to voice calls for audio
 - It is character-by-character, two-way text communication
 - It is a stream of packetized text characters over IP based media
 - “RTT” is the shorthand name for SIP based T.140 text conveyed using RTP
 - It should be thought of and treated as other types of streaming media, such as voice and video

Real Time Communication Compared with SMS

- Real Time Communication is Multi-Media Capable
 - Real Time Communication may include text, voice, and video in combination
 - RTT is text only today
 - RTT can be coupled with audio to deliver both text and simultaneous streaming voice (e.g., background sounds) and in the future simultaneous streaming video
 - Note: Today, TTY sometimes includes background audio interspersed between Baudot text tones ; it requires PSAP capable of “hearing” background audio
- **Not** the same as SMS or other text messaging. **Not** supported by TCC.
 - Text messaging is *not* a stream of information and is more akin to file transfer than a voice call
 - SMS Text-to-9-1-1 sends “chunks” of text, called messages
 - SIP/MSRP based solutions similarly send and receive messages, akin to small files
 - TCCs are built to send a series of “files” back and forth
 - Current Text to 9-1-1 implementations use the Internet and web browsers not fully integrated to the PSAP systems and so are not as robust as today’s voice E9-1-1 system

Text to 9-1-1 Deployment Data

Deployments to Date and Pending



Deployments by PSAP Type

	12/31/2012	12/31/2013	12/31/2014	12/31/2015	9/30/2016
GEM/Emedia	1	31	88	248	335
TTY	0	6	60	149	222
SIP MSRP	0	0	101	150	187
West (MSRP)	1	2	15	96	148
Total PSAPs	2	39	264	643	892

Fewer PSAPs are deploying text to 9-1-1 service. Of the approximate 6,000 PSAPs, the majority have not requested text to 9-1-1 service and, given how much time has passed since being able to request such service, they do not seem to plan to do so prior to NG9-1-1.

Graphic on the left includes both primary and secondary PSAPs. Chart on the right includes only primary PSAPs

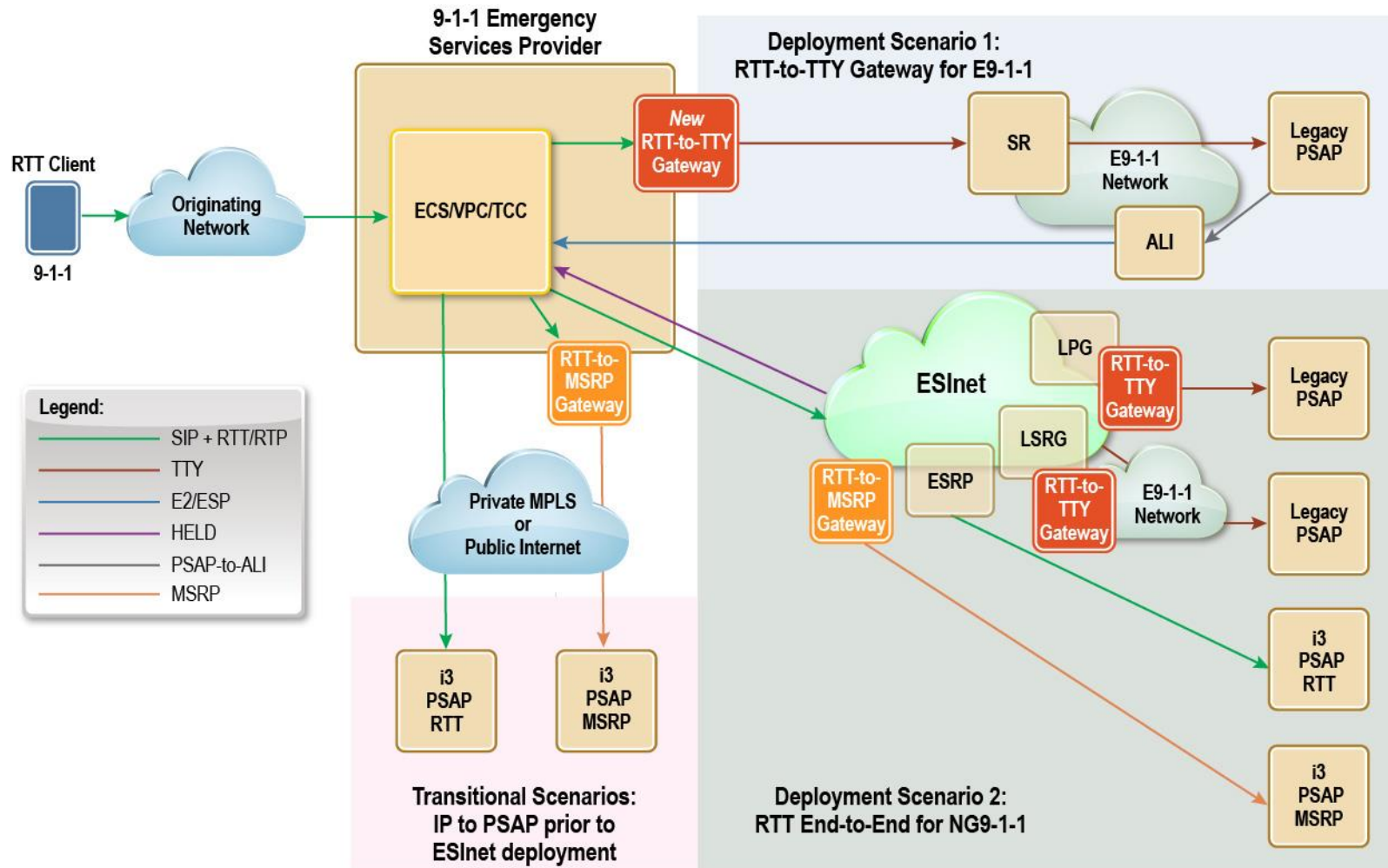
Text to 9-1-1 Impairment Data Since Inception

- Web-browser PSAPs
 - Trouble Tickets: 441
 - Service Impairments: 106
- MSRP PSAPs
 - Trouble Tickets: 20
 - Service Impairments: 6
- TTY PSAPs
 - Trouble Tickets: 45
 - Service Impairments: 8

All web-browser PSAPs use the Internet and have experienced multiple, complete outages.

All MSRP PSAPs that use the Internet have experienced multiple, complete outages.

Sample 9-1-1 Networks with RTT



16_FCC-RTT_F-03

Implementation Details

- Originating RTT
 - RTT call initiation is dependent on user equipment (UE) capability
 - Updated default dialer, using underlying IMS client
 - Additional user interface, still using underlying IMS client
 - RTT delivery is dependent on carrier infrastructure and 911 service provider capabilities
- Terminating RTT
 - Legacy PSAPs (Those PSAPs served by a SR and ALI, LPG, or LSRG)
 - Requirement of new function: RTT-to-TTY gateway
 - 6,000+ existing TTY terminals capable of receiving TTY
 - PSAPs that receive no TTY today will likely receive no or little TTY even with the RTT-to-TTY gateway
 - NG9-1-1 (i3) PSAPs
 - RTT support may be built in to CPE
 - RTT to MSRP conversion may be allowed for CPE that supports MSRP but not RTT
 - NENA i3 ESInet/NGCS standard already supports RTT
 - RTT end-to-end may be allowed prior to ESInet implementation

Summary: RTT-to-TTY

Scenario 1: RTT converted to TTY for E9-1-1 PSAPs

- Pros
 - Reuses existing dedicated voice trunks which are designed for real-time communication and have high service availability
 - Reduces training and capital expenditure burden on PSAPs - reuse existing TTY terminals
 - Leaves all existing nodes unchanged
 - Adds an RTT-to-TTY gateway into the voice network
- Cons
 - Reduced character set, slower speed, less reliable over IP networks
 - Extends reliance on aging TTY equipment at PSAPs

Summary: RTT to an ESInet

Scenario 2: RTT to an ESInet

- Pros
 - Supports full character set
 - Works even on high latency and jitter networks
 - RTT end-to-end is addressed in standards
 - ESInets already consider conversion from RTT to other protocols
 - Leaves all existing nodes unchanged
- Cons
 - ESInets not widely deployed
 - Some development work within the ESInet to support RTT-to-TTY and RTT-to-MSRP

Summary: Transitional Scenario

RTT to an IP capable PSAP (RTT or MSRP)

- Pros
 - Supports full character set
 - Works even on high latency and jitter networks
 - RTT end-to-end is addressed in standards
 - Leaves all existing nodes unchanged
 - Adds a RTT-to-MSRP gateway
 - Does not require an ESInet to be in place
 - Can use any IP connection
- Cons
 - Low cost IP connections, especially the Internet, are known to be unreliable
 - Some development work to support RTT-to-MSRP

Thank you.



Questions?



275 West Street
Annapolis, MD 21401



Kim.scovill@comtechtel.com



@comtechSST



www.comtechtel.com